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(54) **DUAL SENSOR TOUCHSCREEN UTILIZING PROJECTIVE-CAPACITIVE AND FORCE TOUCH SENSORS**

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(58) **Field of Search** 345/173, 179, 345/156, 174, 178; 178/18.03, 18.05, 18.01, 18.9, 18.09; 338/68

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(57) **ABSTRACT**

A method and apparatus for discriminating against false touches in a touchscreen system is provided. The system is designed to confirm a touch registered by one touch sensor with another touch sensor, preferably of a different sensor type, prior to acting upon the touch (i.e., sending touch coordinates to the operating system). If the touch registered by the first touch sensor is not confirmed by the second touch sensor, the touch is invalidated. Thus the strengths of one type of sensor are used to overcome the deficiencies of another type of sensor. This system is particularly well suited to meet the demands of an outdoor or semi-outdoor application. In one embodiment, one or more force sensors are used as the false touch sensor and a projective-capacitive sensor is used as the position coordinate determining sensor. In another embodiment, a projective-capacitive sensor is used as the false touch sensor. As the projective-capacitive sensor is only being used to provide touch confirmation, in this embodiment very few electrodes are required as well as minimal channel electronics. In another embodiment, both touch sensors are capable of providing accurate touch coordinates. In this configuration the system preferably determines which of the sensors is more likely to provide accurate information based on the circumstances.

26 Claims, 7 Drawing Sheets